

## Environmental Protection Agency

## § 89.307

(c) The symbols in table 2 in appendix A of this subpart apply to this subpart.

[59 FR 31335, June 17, 1994. Redesignated at 63 FR 56995, Oct. 23, 1998]

### § 89.304 Equipment required for gaseous emissions; overview.

(a) All engines subject to this subpart are tested for exhaust emissions. Engines are operated on dynamometers meeting the specification given in § 89.306.

(b) The exhaust is tested for gaseous emissions using a raw gas sampling system as described in § 89.412 or a constant volume sampling (CVS) system as described in § 89.419. Both systems require analyzers (see paragraph (c) of this section) specific to the pollutant being measured.

(c) Analyzers used are a non-dispersive infrared (NDIR) absorption type for carbon monoxide and carbon dioxide analysis; a heated flame ionization (HFID) type for hydrocarbon analysis; and a chemiluminescent detector (CLD) or heated chemiluminescent detector (HCLD) for oxides of nitrogen analysis. Sections 89.309 through 89.324 set forth a full description of analyzer requirements and specifications.

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### § 89.305 Equipment measurement accuracy/calibration frequency.

The accuracy of measurements must be such that the maximum tolerances shown in Table 3 in appendix A of this subpart are not exceeded. Calibrate all equipment and analyzers according to the frequencies shown in Table 3 in appendix A of this subpart.

[59 FR 31335, June 17, 1994. Redesignated at 63 FR 56995, Oct. 23, 1998]

### § 89.306 Dynamometer specifications and calibration weights.

(a) *Dynamometer specifications.* The dynamometer test stand and other instruments for measurement of power output must meet the accuracy and calibration frequency requirements shown in table 3 in appendix A of this subpart. The dynamometer must be capable of performing the test cycle described in § 89.410.

(b) *Dynamometer calibration weights.* A minimum of six calibration weights for each range used are required. The weights must be spaced to reflect good engineering judgement such that they cover the range of weights required and must be traceable to within 0.5 percent of NIST weights. Laboratories located in foreign countries may certify calibration weights to local government bureau standards.

[59 FR 31335, June 17, 1994. Redesignated at 63 FR 56995, Oct. 23, 1998]

### § 89.307 Dynamometer calibration.

(a) If necessary, follow the dynamometer manufacturer's instructions for initial start-up and basic operating adjustments.

(b) Check the dynamometer torque measurement for each range used by the following method:

(1) Warm up the dynamometer following the dynamometer manufacturer's specifications.

(2) Determine the dynamometer calibration moment arm (a distance/weight measurement). Dynamometer manufacturer's data, actual measurement, or the value recorded from the previous calibration used for this subpart may be used.

(3) When calibrating the engine flywheel torque transducer, any lever arm used to convert a weight or a force through a distance into a torque must be in a horizontal position ( $\pm 5$  degrees).

(4) Calculate the indicated torque (IT) for each calibration weight to be used by:

$$IT = \text{calibration weight (N)} \times \text{calibration moment arm (m)}$$

(5) Attach each calibration weight specified in § 89.306 to the moment arm at the calibration distance determined in paragraph (b)(2) of this section. Record the power measurement equipment response (N-m) to each weight.

(6) For each calibration weight, compare the torque value measured in paragraph (b)(5) of this section to the calculated torque determined in paragraph (b)(4) of this section.

(7) The measured torque must be within either 2 percent of point or 1 percent of the engine maximum torque of the calculated torque.